OCO-2 Status
27 Feb 2018

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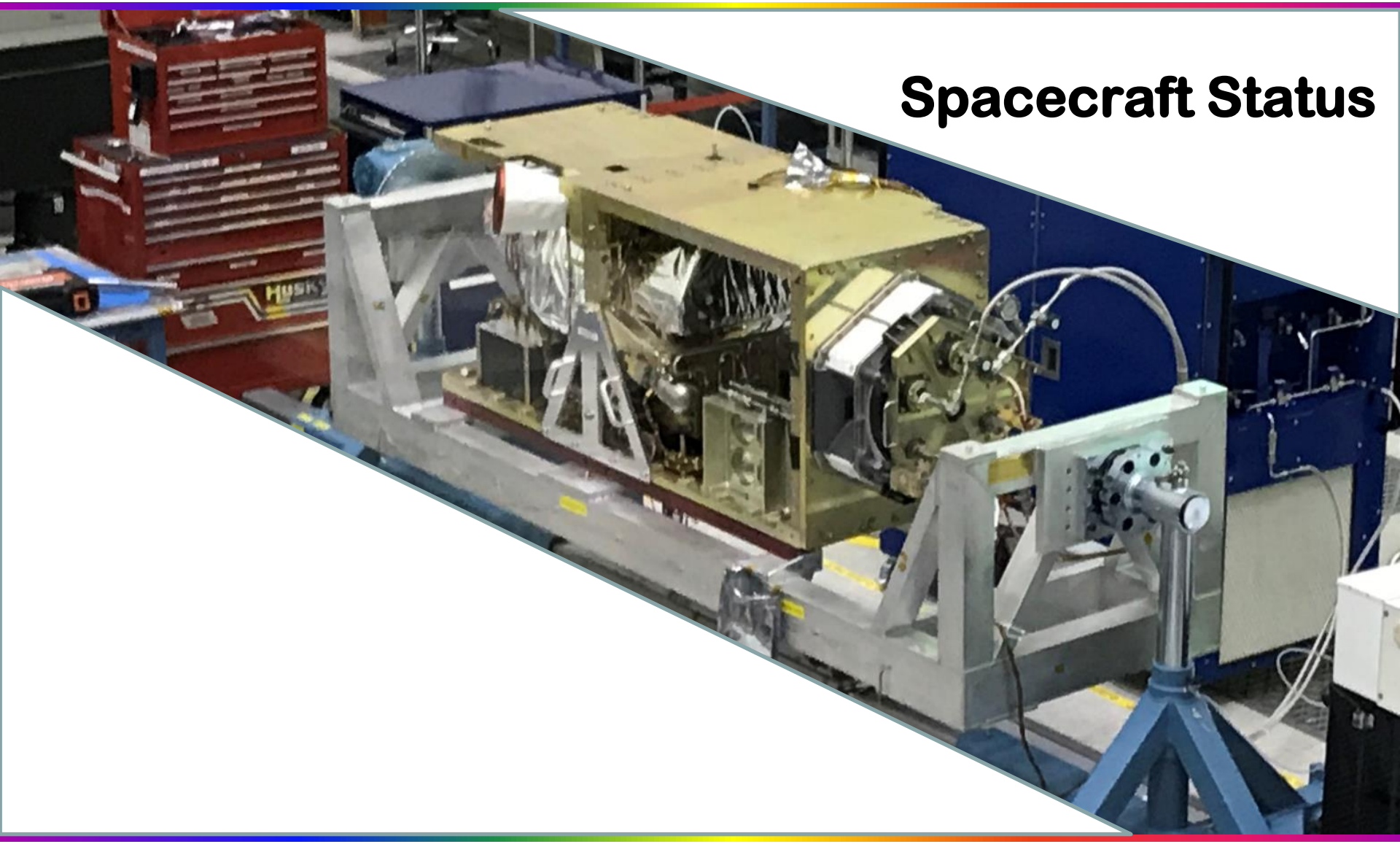
for the OCO-2 Science Team

27 February, 2018

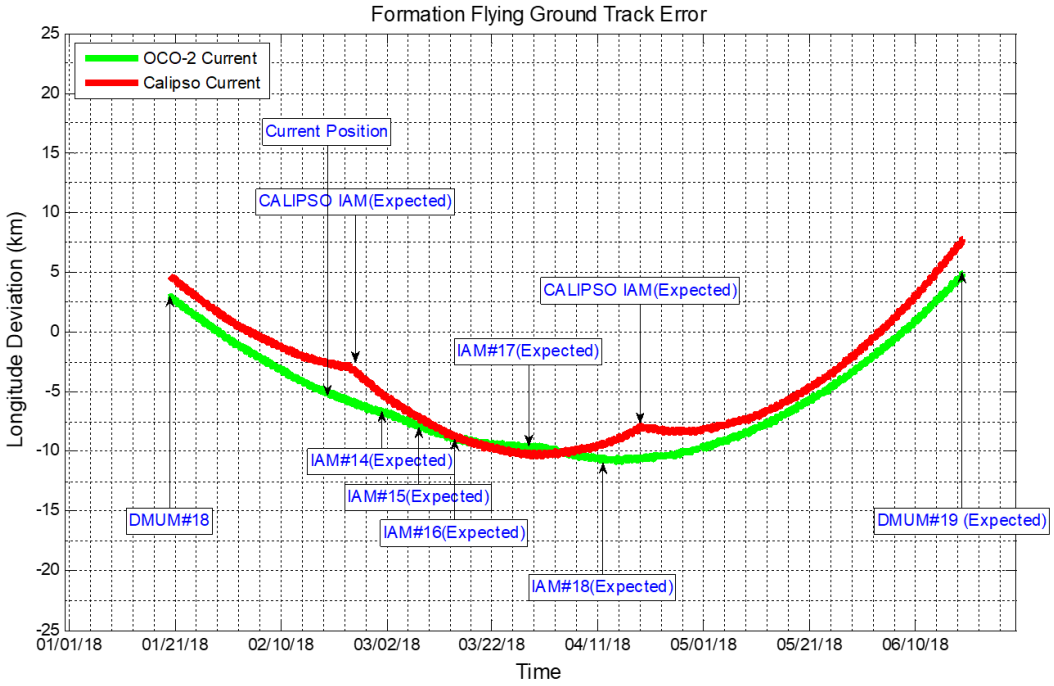
Overview

- Observatory Status: Nominal
  - Formation flying overlap expected to 100% through 18 June 2018
  - 2018 Inclination Adjust Maneuvers: 1, 8, 15, 29 March, 12 April
- Instrument Status: Nominal
  - Decontamination Cycle conducted from 13-20 February
  - Return to Science on orbit 19355 on 20 Feb 2018
- OCO-2 Science Team Selections
- Progress analyzing the V8 Product
- Updates on CloudSat, OCO-3, GOSAT-2, GeoCarb, and TanSat
- Plans for the 20-21 March Science Team meeting
- Highlights of the OCO-2 presentations submitted to EGU, IWGGMS-14, JpGU, AOGS, COSPAR



Spacecraft Status

OCO-2/CALIPSO Ground Track Overlap

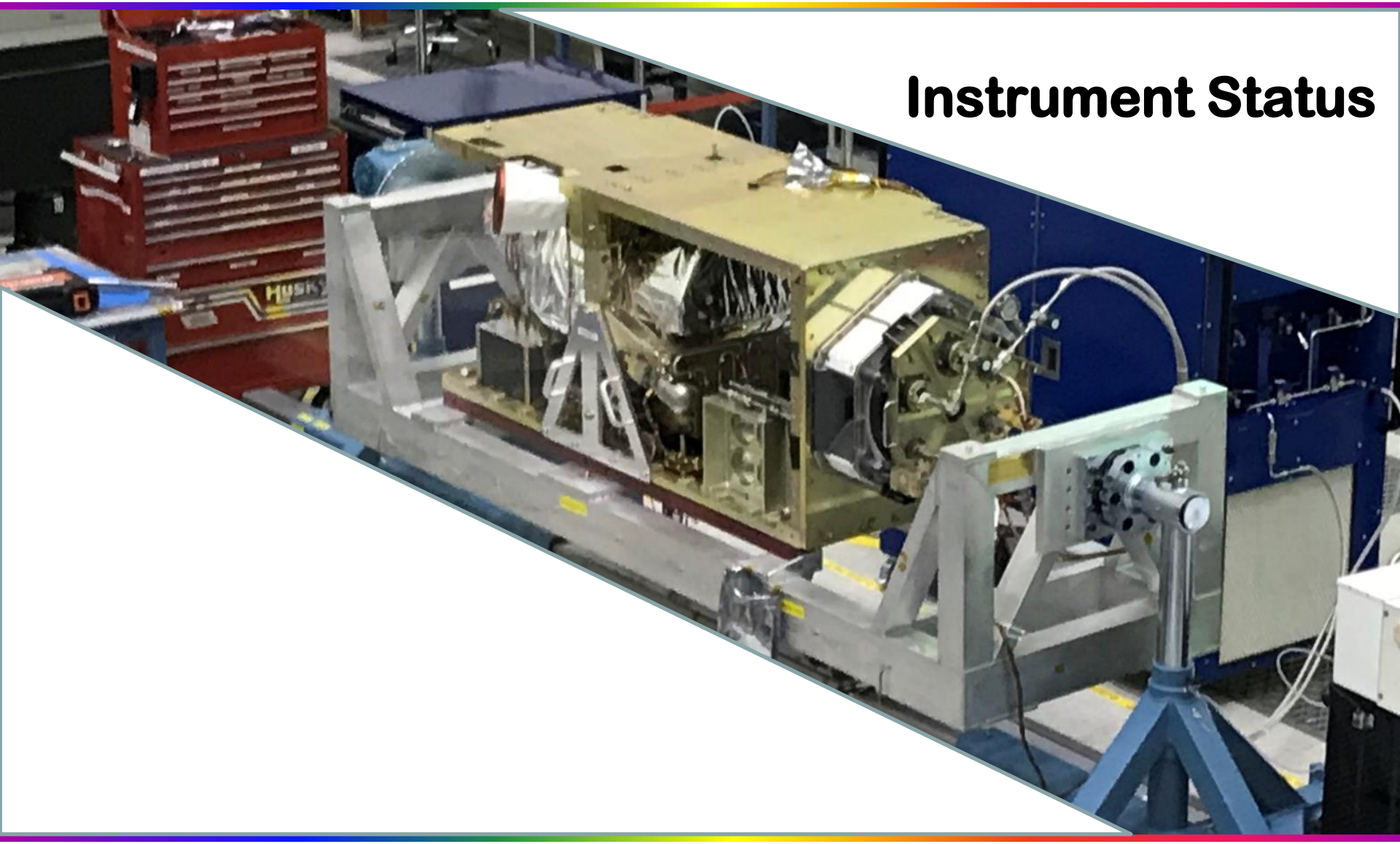


The OCO-2 Navigation team Expects to maintain 100% overlap with the CALIPSO ground throughout the upcoming inclination adjust maneuver campaign, assuming no risk mitigation maneuvers are needed.

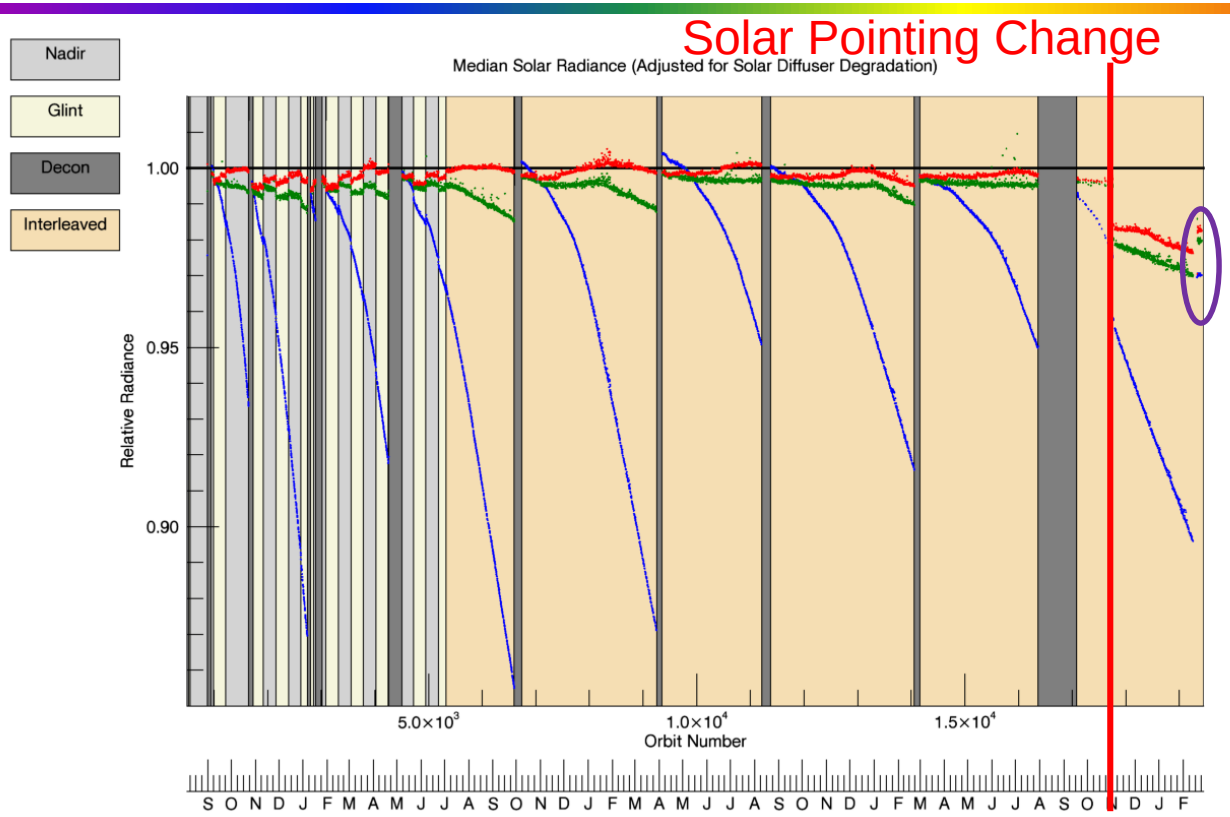
The Annual A-Train Inclination Adjust Maneuver campaign will start on March 1st and proceed through 12 April. The nominal dates and times of the burns are listed to the right. We expect to lose 1-2 orbits of data during each maneuver.

Start Time (UTCG)	Stop Time (UTCG)
01 Mar 2018 21:37:36	01 Mar 2018 21:40:56
08 Mar 2018 21:43:56	08 Mar 2018 21:47:10
15 Mar 2018 21:50:02	15 Mar 2018 21:53:32
29 Mar 2018 22:02:33	29 Mar 2018 22:05:47
12 Apr 2018 22:14:41	12 Apr 2018 22:18:21

Instrument Status



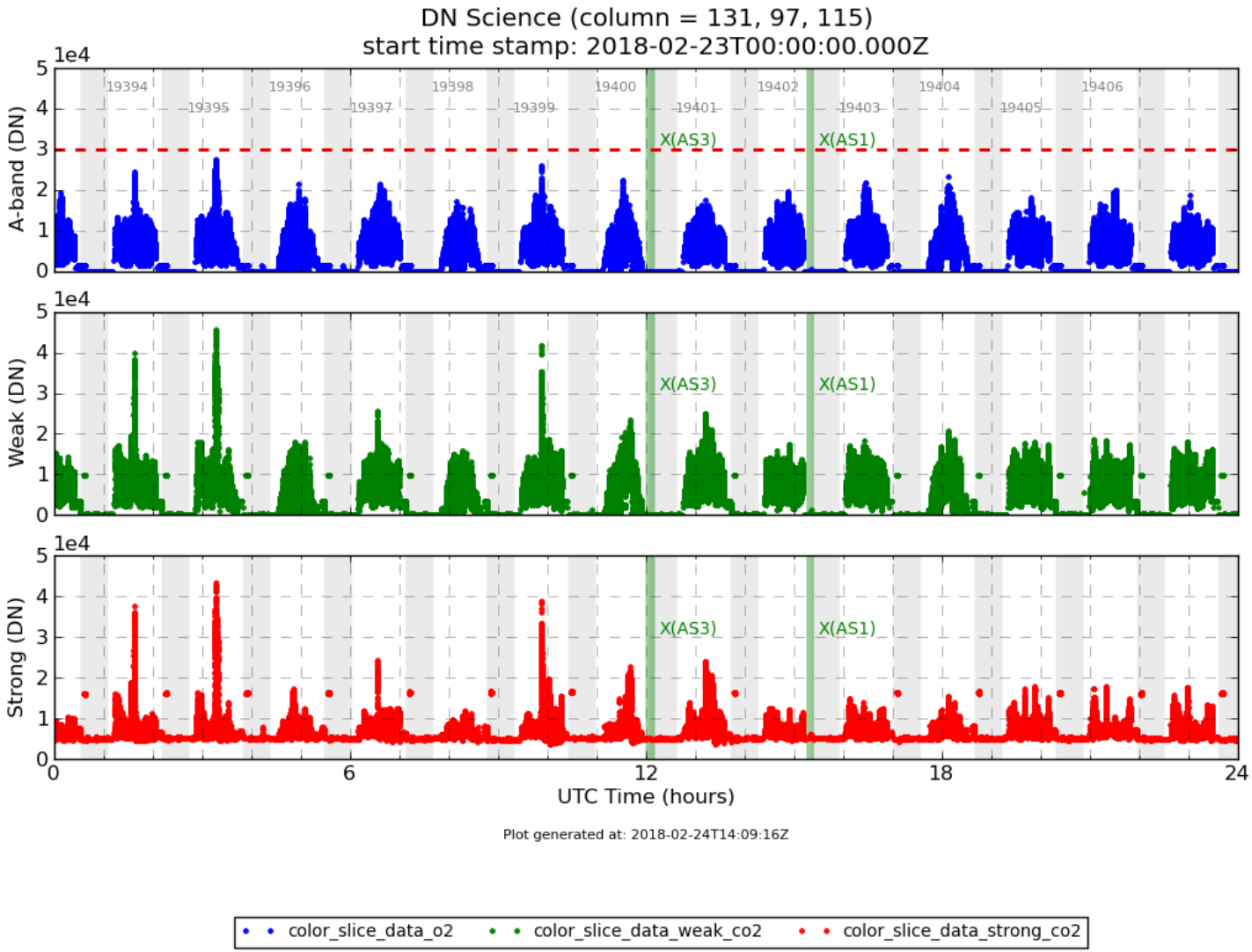
Instrument Status



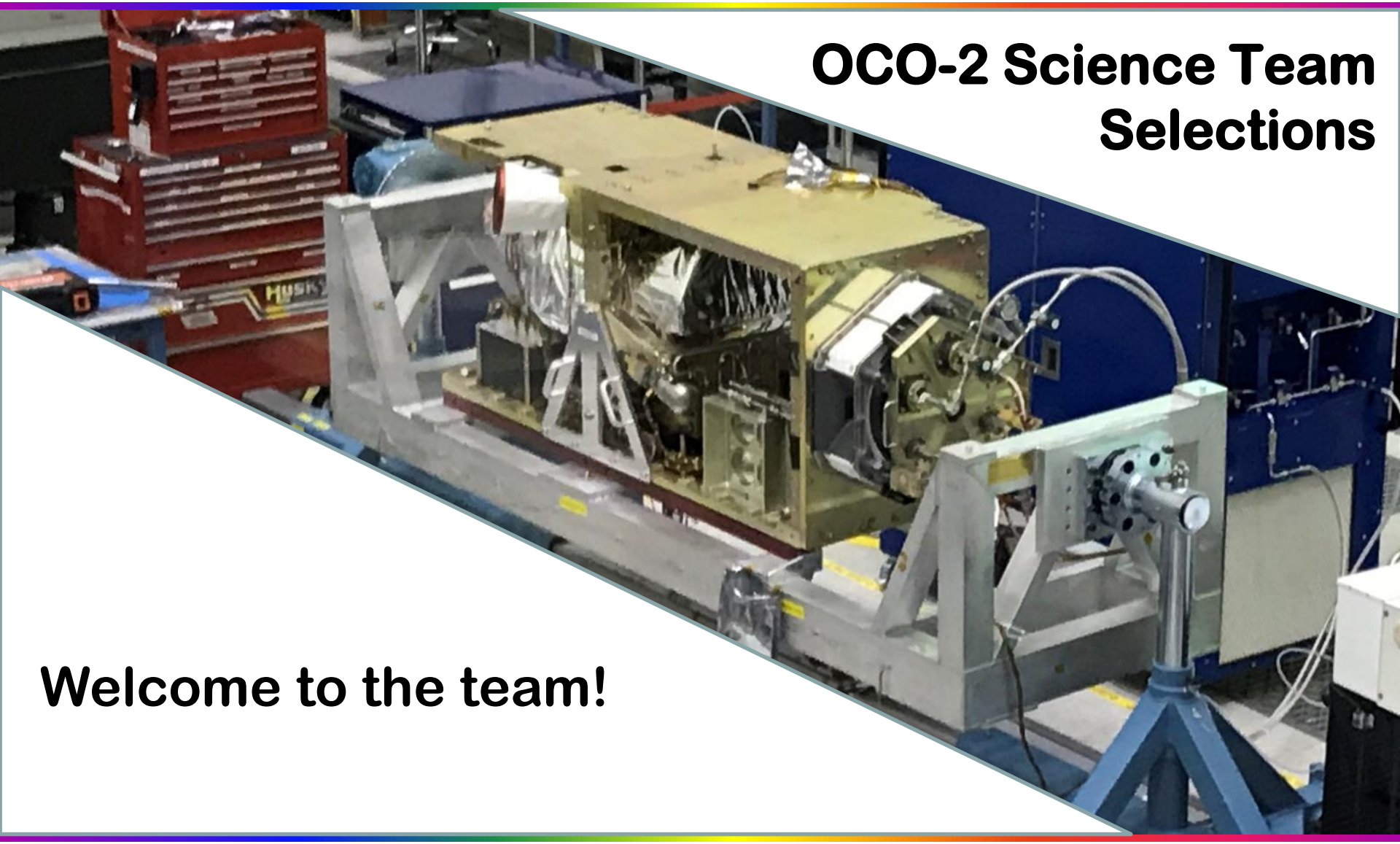
The latest Decon restored the throughput to the new "nominal clean" levels in all 3 bands.

The OCO-2 instrument continues to operate nominally. The change in November 2017 resulted from the 2.5° solar-off-pointing adopted to prevent accidentally looking right at the sun during solar calibration. This change introduced a 1.5% reduction in the throughput of the solar diffuser that is being compensated as part of the calibration process. The latest decon was performed on 13-20 February 2018.

A Glint Near-Saturation Event



Intense, but unsaturated glint observations at low latitudes continue to be common.

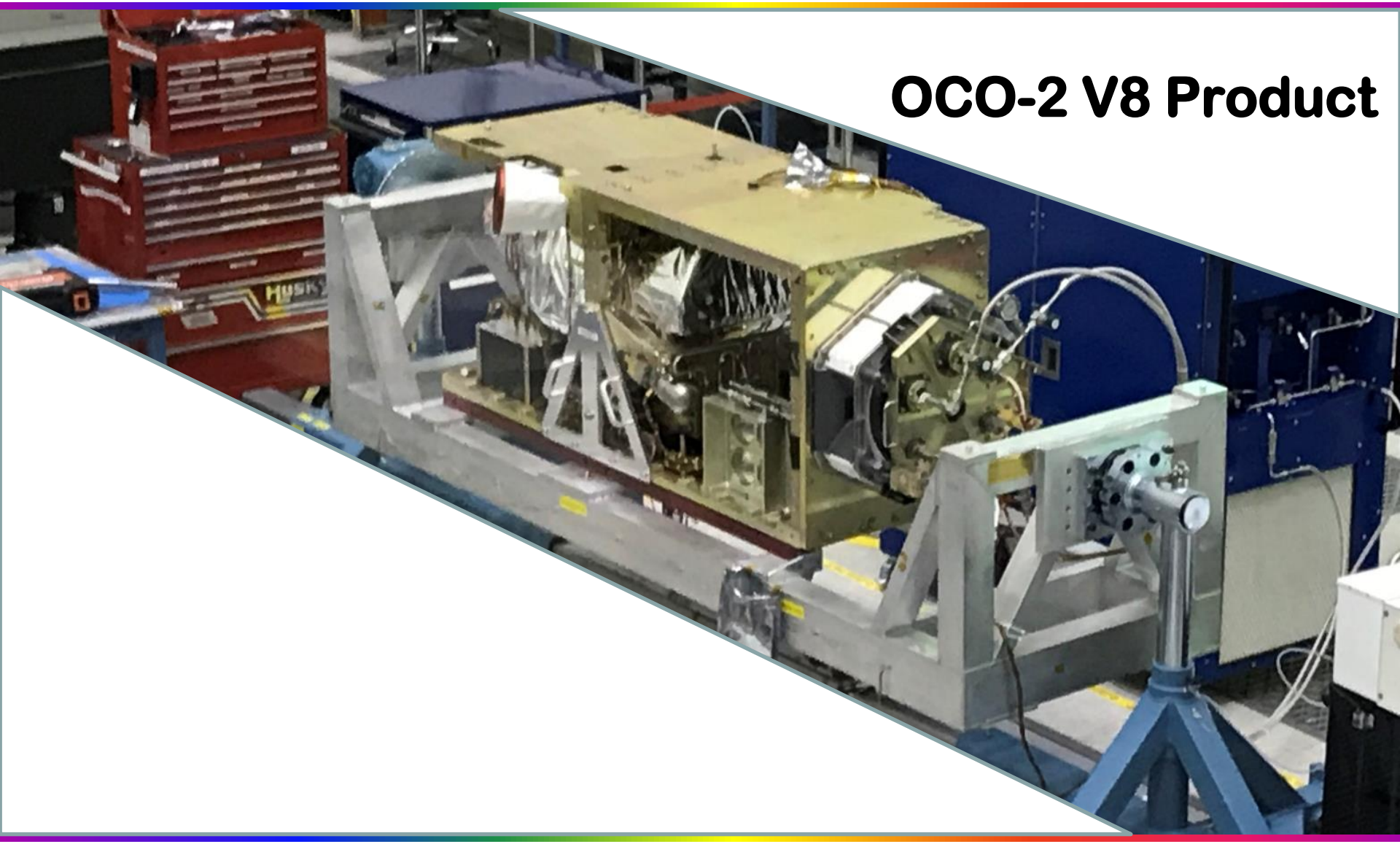


OCO-2 Science Team Selections

Welcome to the team!

22 Selected Science Investigations

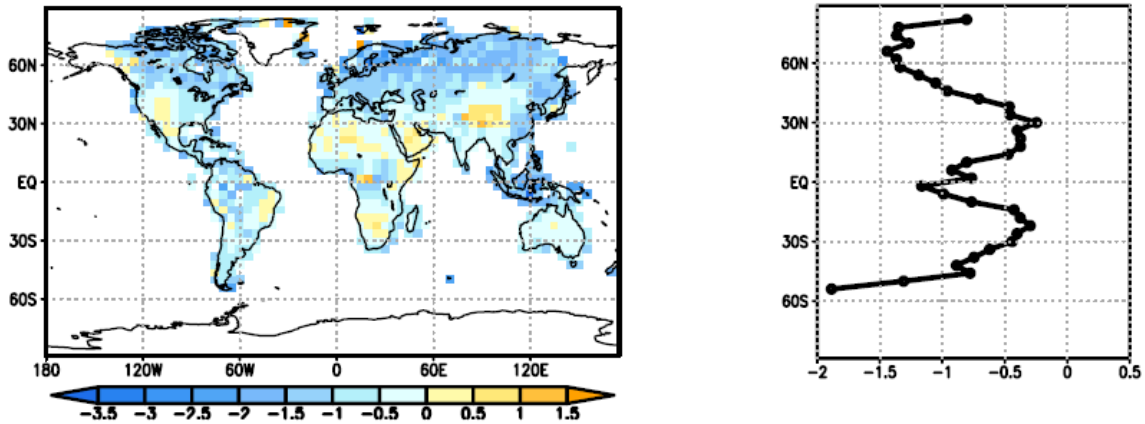
Gretchen	Keppel-Aleks	Detecting and Attributing Interannual Variations in Land and Ocean Fluxes from OCO-2
Eric	Kort	Quantifying global megacity CO2 emissions II: accounting for transport errors, biospheric contributions, and exploiting multiple remote sensing observations
Steven	Massie	Towards Detection and Mitigation of 3D Cloud Effects in XCO2 Retrievals
Hartmut	Boesch	Evaluations and Validation of OCO Level 2 Retrieval Products and Application for Model and Inventory Testing
Brian	Drouin	Spectroscopy in Support of the OCO Missions
Aronne	Merrelli	Partial Column XCO2 and Cloud Property Retrievals for OCO-2
Lesley	Ott	GEOS Modeling and Assimilation Products in Support of the OCO Missions
Noel	Cressie	Spatial Statistical Analysis of OCO-2 Data
Sourish	Basu	Reducing the impact of model transport error on flux estimates using CO2 profile information from OCO2 in concert with an online bias correction
Andre	Butz	RemoTeC/OCO-2: Assessing retrieval errors and biases through L2 algorithm performance comparison
Scot	Miller	Magnitude and drivers of interannual variability in terrestrial and ocean CO2 fluxes from OCO-2 using a geostatistical inverse model
William	Simpson	Mapping spatial differences in carbon dioxide exchange dynamics across the Boreal Forest
David	Schimel	Observing and validating carbon-climate feedbacks with OCO-2
Nicholas	Parazoo	Fluorescence Based Constraints On Urban Biogenic CO2 Fluxes from OCO-2, OCO-3, and CLARS
Junjie	Liu	Investigating the impact of extreme climate events on terrestrial biosphere carbon flux interannual variability with a regional high-resolution L-4 surface CO2 flux product
Laure	Resplandy	Ocean Processes Controlling Carbon Fluxes during ENSO Constrained by OCO-2 and Oxygen Measurements
Johanna	Tamminen	Data-driven analysis for the OCO missions
David	Baker	An Intercomparison of Global Flux Inversions of OCO-2 and OCO-3 CO2 Data for Carbon Cycle Science and Bias Correction
Colm	Sweeney	Establishing WMO traceability for XCO2 from OCO-2 using AirCore and aircraft vertical profiles
Christian	Frankenberg	ExploSIF: Exploiting SIF Potentials for Carbon Cycle Science
Andy	Jacobson	OCO constraints on tropical land fluxes
Sandy	Burden	Statistical evaluation of CO2 flux fields obtained from OCO-2 retrievals



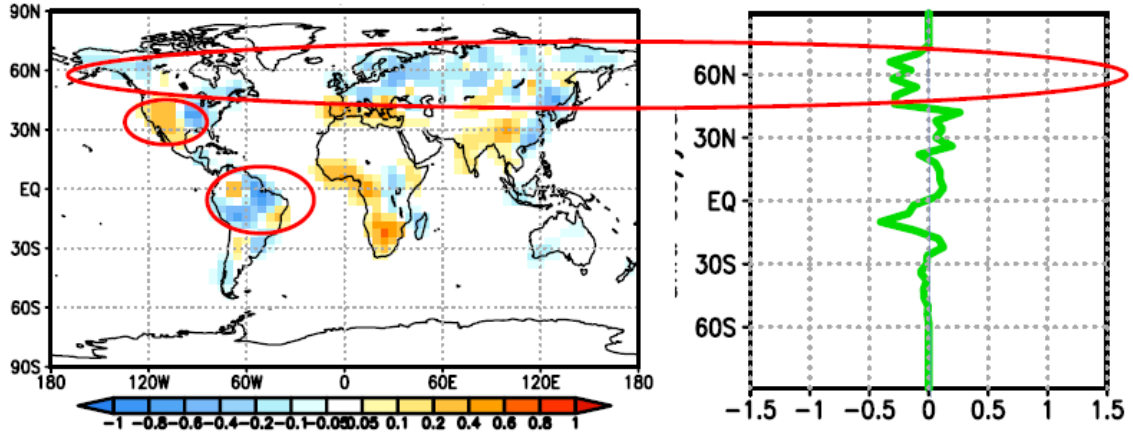
OCO-2 V8 Product

Differences between B8 and B7 X_{CO2} and impacts on fluxes

2016 B8 and B7 X_{CO2} differences



Posterior flux differences between B8 and B7 land nadir inversions for 2016

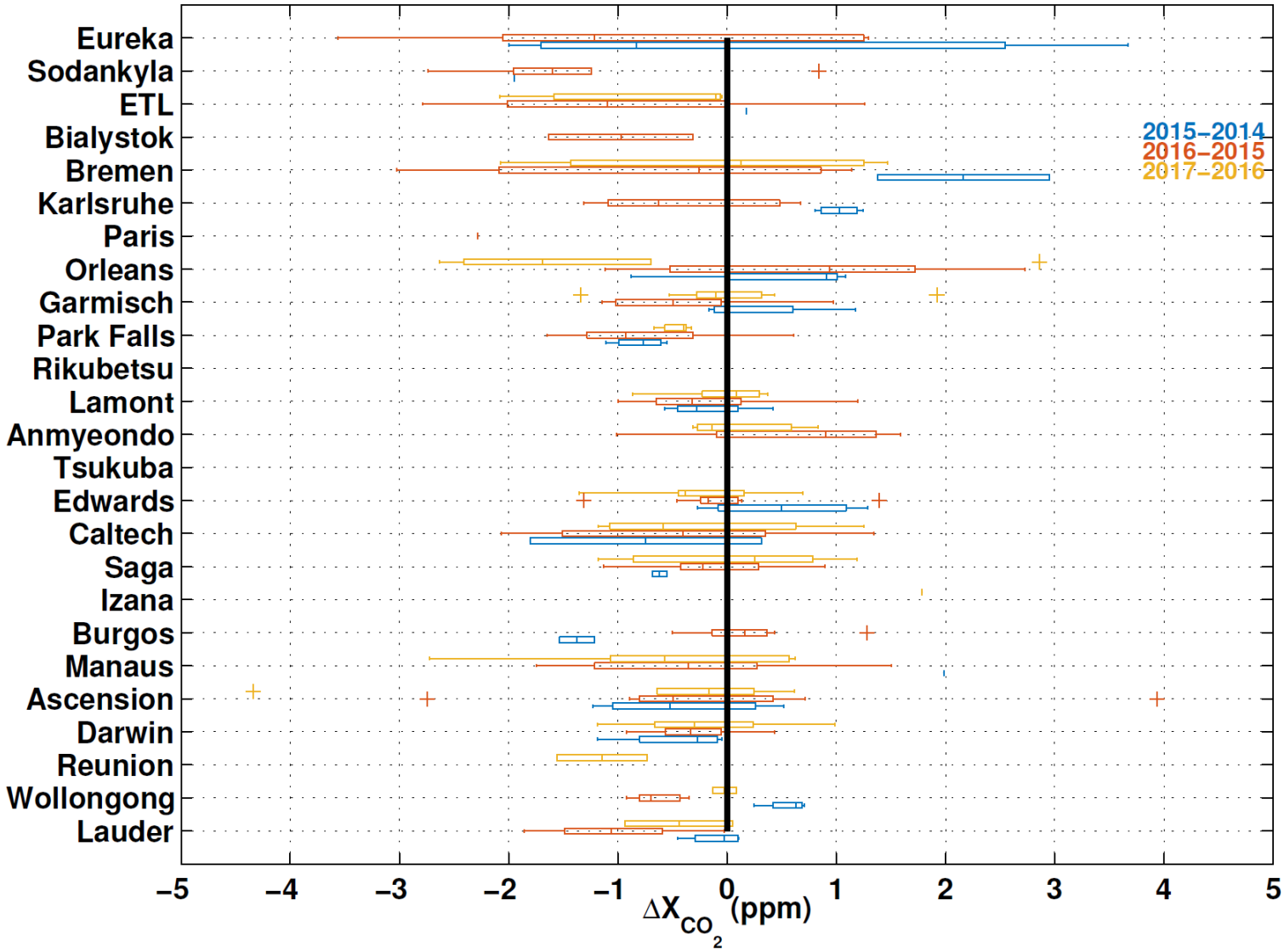


Spatial maps of differences between the OCO-2 B8 and B7 X_{CO2} products over land show significant spatial trends (left) and a global difference of -0.49 ppm.

Preliminary efforts to quantify how these differences affect flux inversions (left) indicate positive fluxes over the western and Southern Africa, smaller fluxes over the arctic.

Junjie Liu et al.

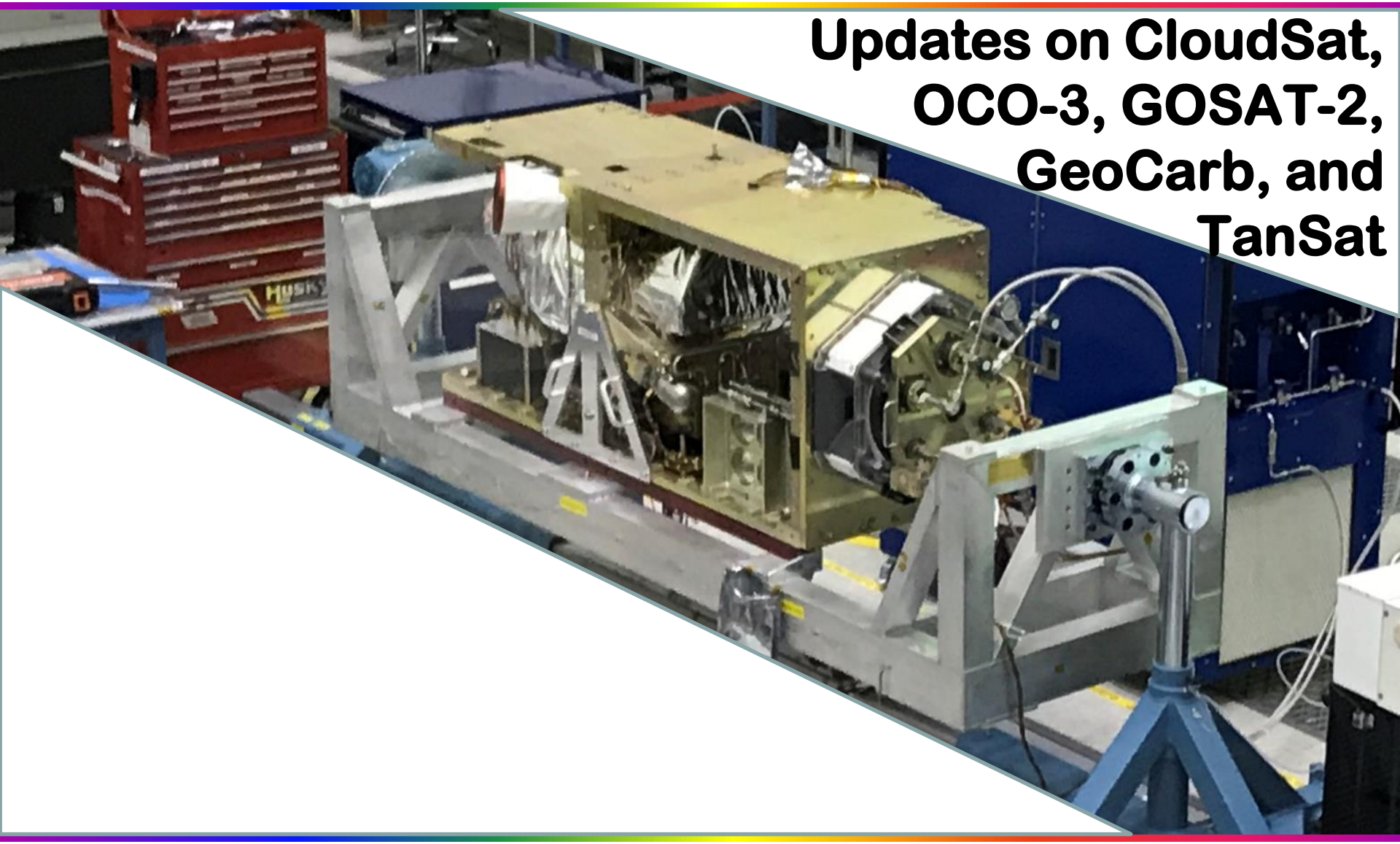
Secular Trends in V8 - TCCON



Differences between coincident OCO-2 and TCCON observations show small, negative year-to-year trends.

The largest, but most uncertain trends are seen at high latitudes.

D. Wunch et al.

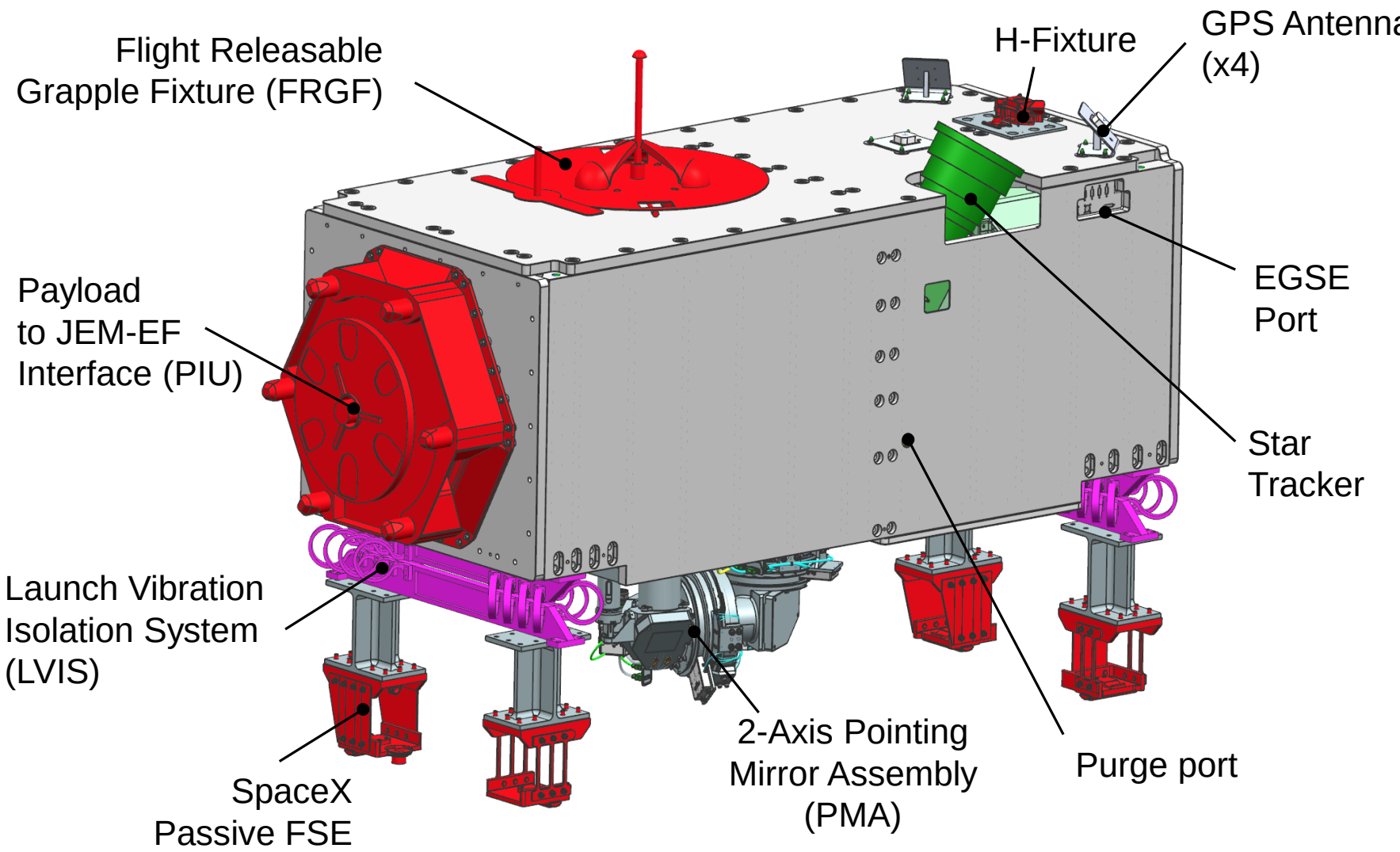


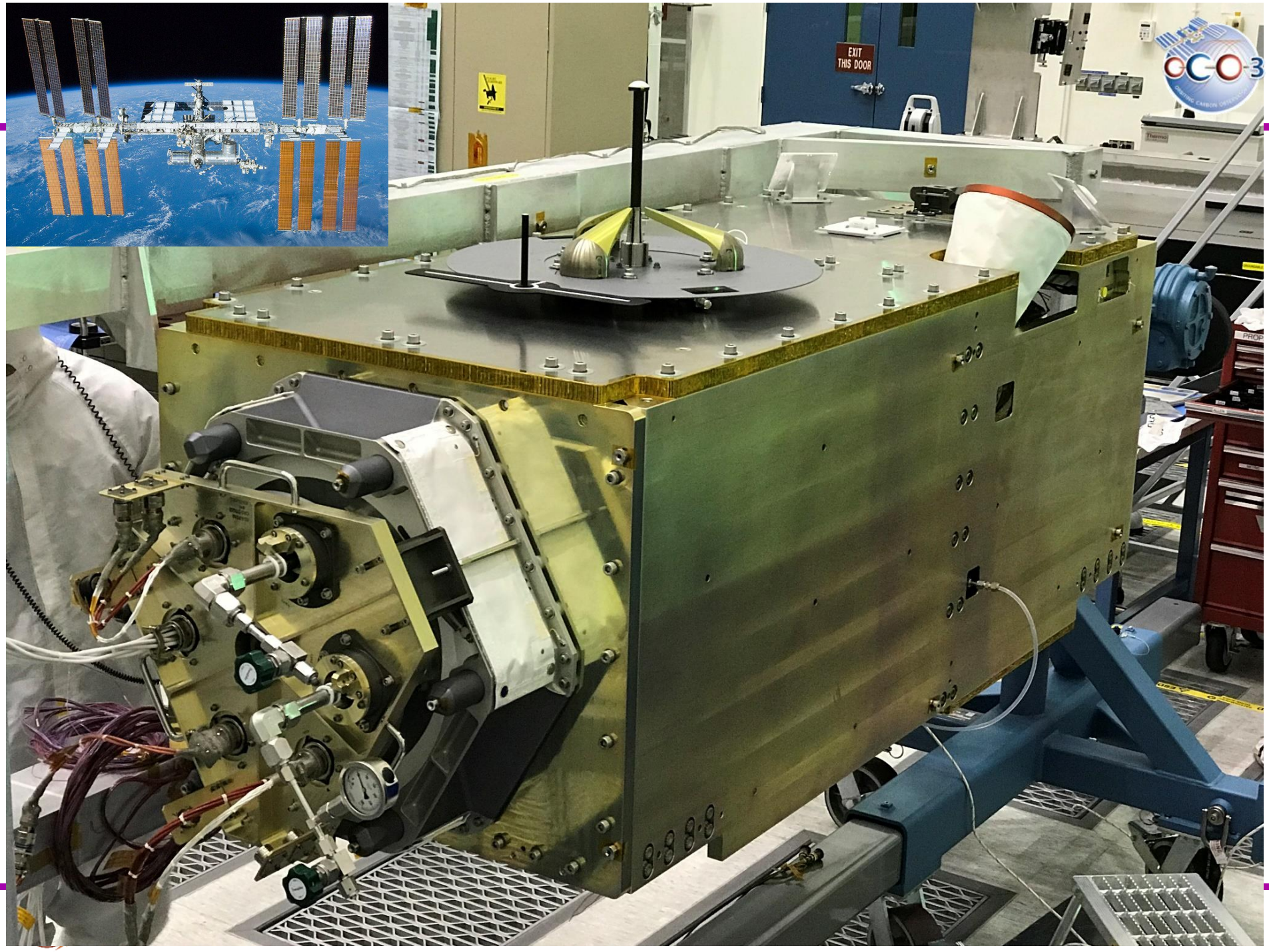
Updates on CloudSat, OCO-3, GOSAT-2, GeoCarb, and TanSat

OCO-3 Status

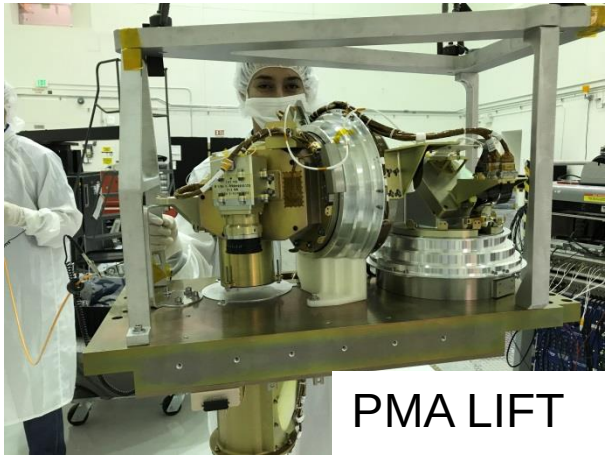
- The OCO-3 instrument status is still not settled
  - Not included in the President's budget proposals for FY 18 or FY 19
  - Not included in the House of Representatives FY 18 NASA Budget, but included in the Senate FY 18 NASA Budget
- JPL has been instructed to complete the preflight testing
- The OCO-3 team is preparing to conduct the "final" thermo vacuum (TV) test at JPL in late March of 2018

OCO-3 Payload Exterior

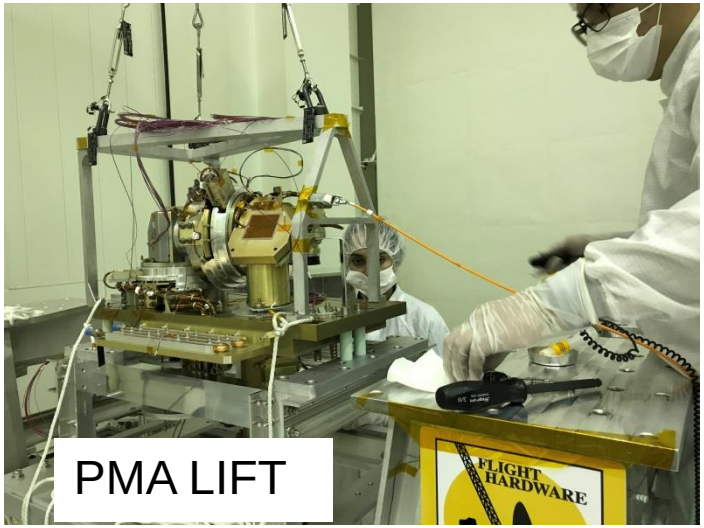



EXIT
THIS DOOR

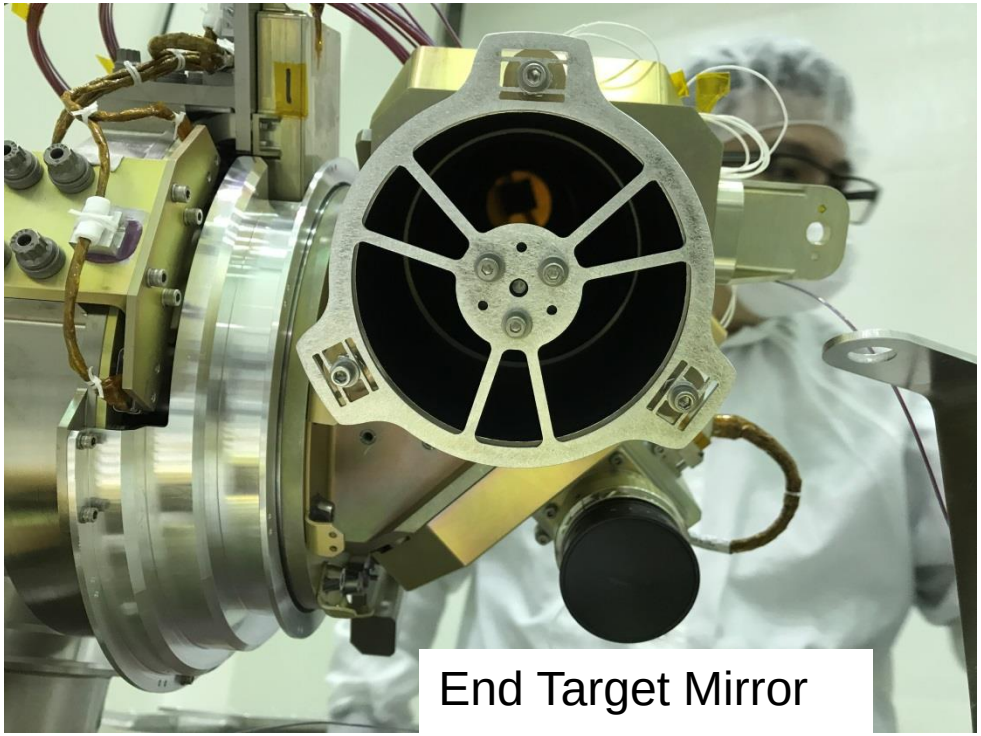
The OCO-3 Pointing Mechanism Assembly



PMA LIFT



PMA LIFT



End Target Mirror

CloudSat

- On Feb. 22, following the loss of one of its reaction wheels, the 12-year-old CloudSat satellite executed two thruster burns, placing it in a “safe exit” orbit below the altitude of the A-Train.

- This is the 2nd time that CloudSat has left the A-Train. The first time was in 2011, when the spacecraft was experiencing battery problems.

- CloudSat will continue to operate in “Daytime Only Operations” from its new, lower orbit, using its 3 remaining reaction wheels.

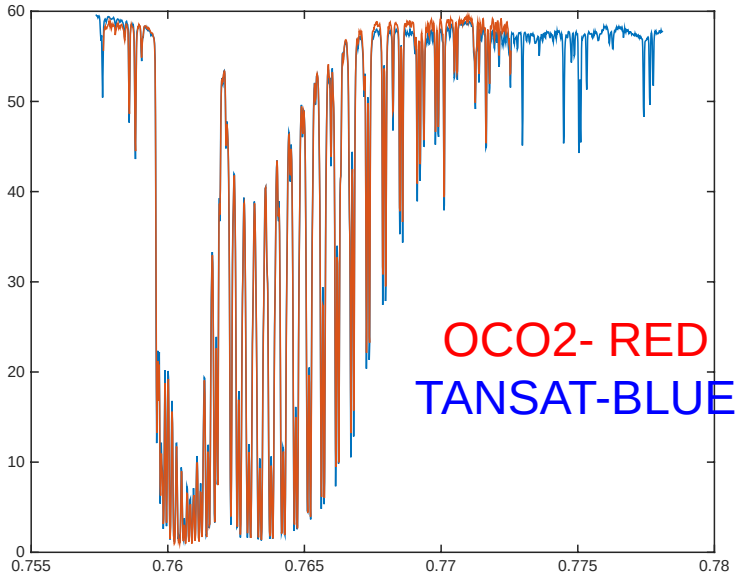
TanSat Encounters

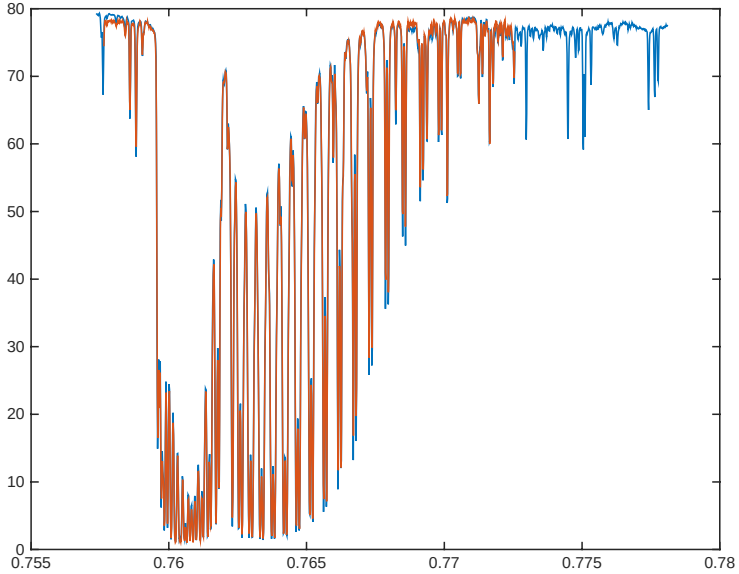
- TanSat and OCO-2 have a closest approach every ~4 months
- These times are ideal for comparing products
  - TanSat - OCO-2 Closest Approach on 4/20/17 at 04:20 GMT
    - Range is ~ 8.5 km
    - Along Track separation is ~ 5.0 km
    - Cross Track separation is ~ -6.8 km
    - Radial separation is ~ -1.0 km
  - TanSat - OCO-2 Closest Approach on 09/09/17 at 08:32 UTC
    - Range is ~ 8.0 km
    - Along Track separation is ~ 0.4 km
    - Cross Track separation is ~ 1.0 km
    - Radial separation is ~ -7.9 km
  - TanSat - OCO-2 Closest Approach on 02/12/18 12:16:18 UTC
    - Range is ~ 6.5 km
    - Along Track separation is ~ 6.4 km
    - Cross Track separation is ~ 0.11 km
    - Radial separation is ~ 1.01 km

Less useful because OCO-2 was not operating due to the solar diffuser anomaly

Most recent closest approach!

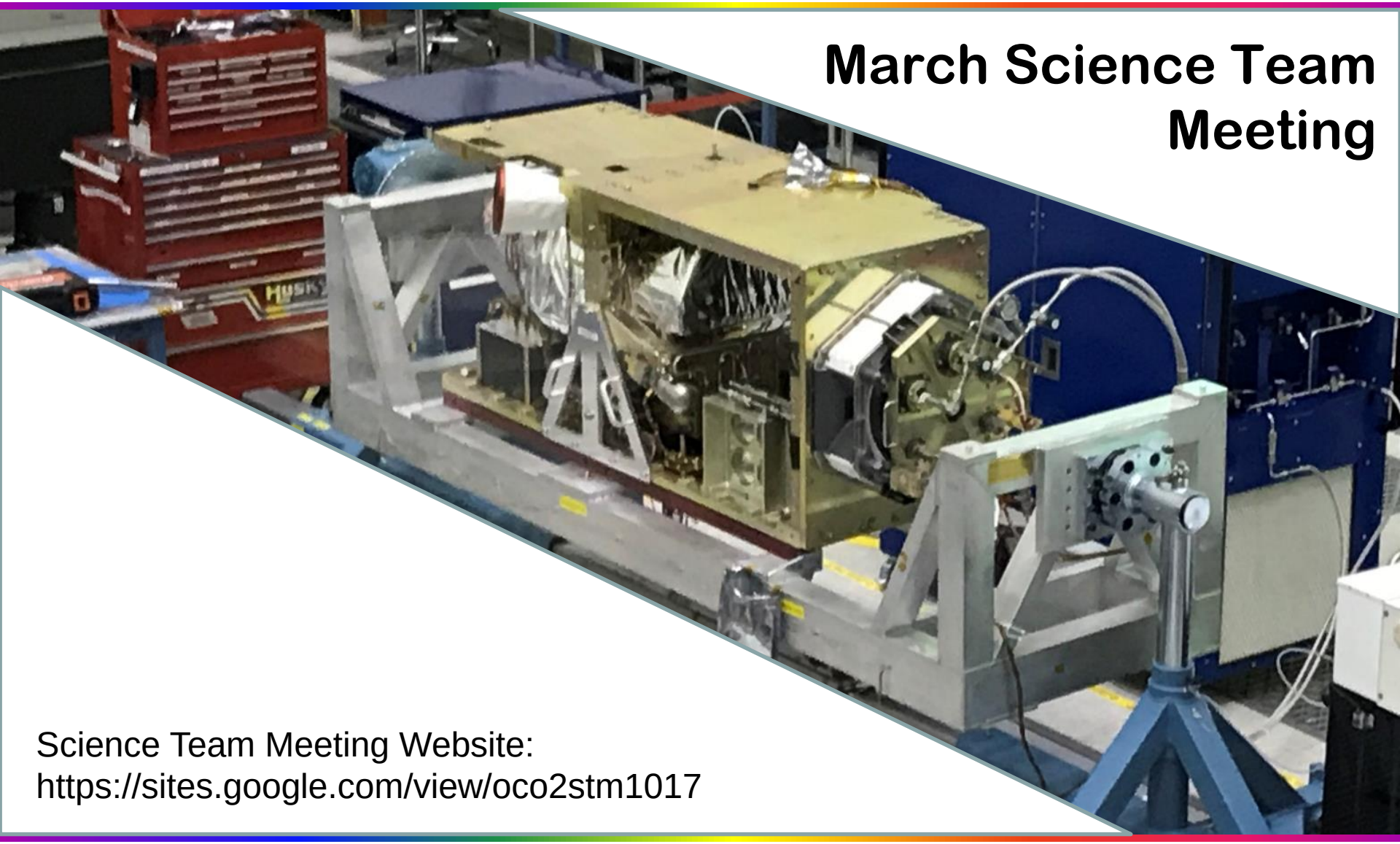
Comparisons of OCO-2 and TanSat Spectra





Preliminary comparisons of nearly coincident OCO-2 and TanSat nadir spectra from April 20, 2017 are similar, but the OCO-2 spectra have to be multiplied by a factor of 2 to match the TanSat spectra. We believe that this is because the OCO-2 L1B product reports the (linearly-polarized) radiance it measures, while the TanSat L1B files may report the partially-polarized radiance incident on the instrument. We are in the process of verifying this.

Chao Liu and Yuk Yung



March Science Team Meeting

Science Team Meeting Website:
https://sites.google.com/view/oco2stm1017

March 20-21 OCO-2 Science Team Meting

- The OCO-2 science team meeting will be held **on March 20 and 21 in the Ramo Auditorium on the Caltech Campus in Pasadena, CA**
  - The meeting will include plenary, breakouts on select topics, and the popular speed talks!
  - We were not able to secure a location for posters this year
  - 66 people had registered as of 26 Feburary

- **Breakouts Sessions will be held on Monday, March 19th**
  - **Flux Inversion, SIF**

- **A GeoCARB meeting will be held on March 22, at the same venue**

- **Logistical information is included on the web site:**

https://sites.google.com/view/oco2stm1017/meeting-location-and-accomodations

Draft Agenda, Day 1

Tuesday, March 20th, Ramo Auditorium, Caltech

Topic	Speaker	Start Time	end time	duration (min)
Registration and Check in		8:00 AM	8:30 AM	0:30
Welcome from HQ & OCO-2 Project	Ken & Mark	8:30 AM	8:50 AM	0:20
Logistics and Meeting goals	Eldering & Gunson	8:50 AM	9:05 AM	0:15
Mission Status	Annmarie Eldering	9:05 AM	9:20 AM	0:15
Looking forward - plans for coming years	Annmarie Eldering	9:20 AM	9:35 AM	0:15
speed talks part 1	the team	9:35 AM	9:55 AM	0:20
coffee		9:55 AM	10:25 AM	0:30
Science Plenary	Rong Fu	10:25 AM	10:55 AM	0:30
paper presentations (Schuh, Crowell, Wier, Basu, 20 mins each)		10:55 AM	12:15 PM	1:20
LUNCH	ALL	12:15 PM	1:15 PM	1:00
aircraft intercomparisons & validation	Greg Osterman +	1:15 PM	1:55 PM	0:40
model evaluation with aircraft	Junjie Liu	1:55 PM	2:15 PM	0:20
Ambassador program	Karen Yuen	2:15 PM	2:30 PM	0:15
coffee break	All	2:30 PM	3:00 PM	0:30
UQ - modeling, flux implications, alg implications	Jon Hobbs	3:00 PM	4:00 PM	1:00
v8 L2 evaluations (CWO, SSK, ??_	see list	4:00 PM	5:00 PM	1:00

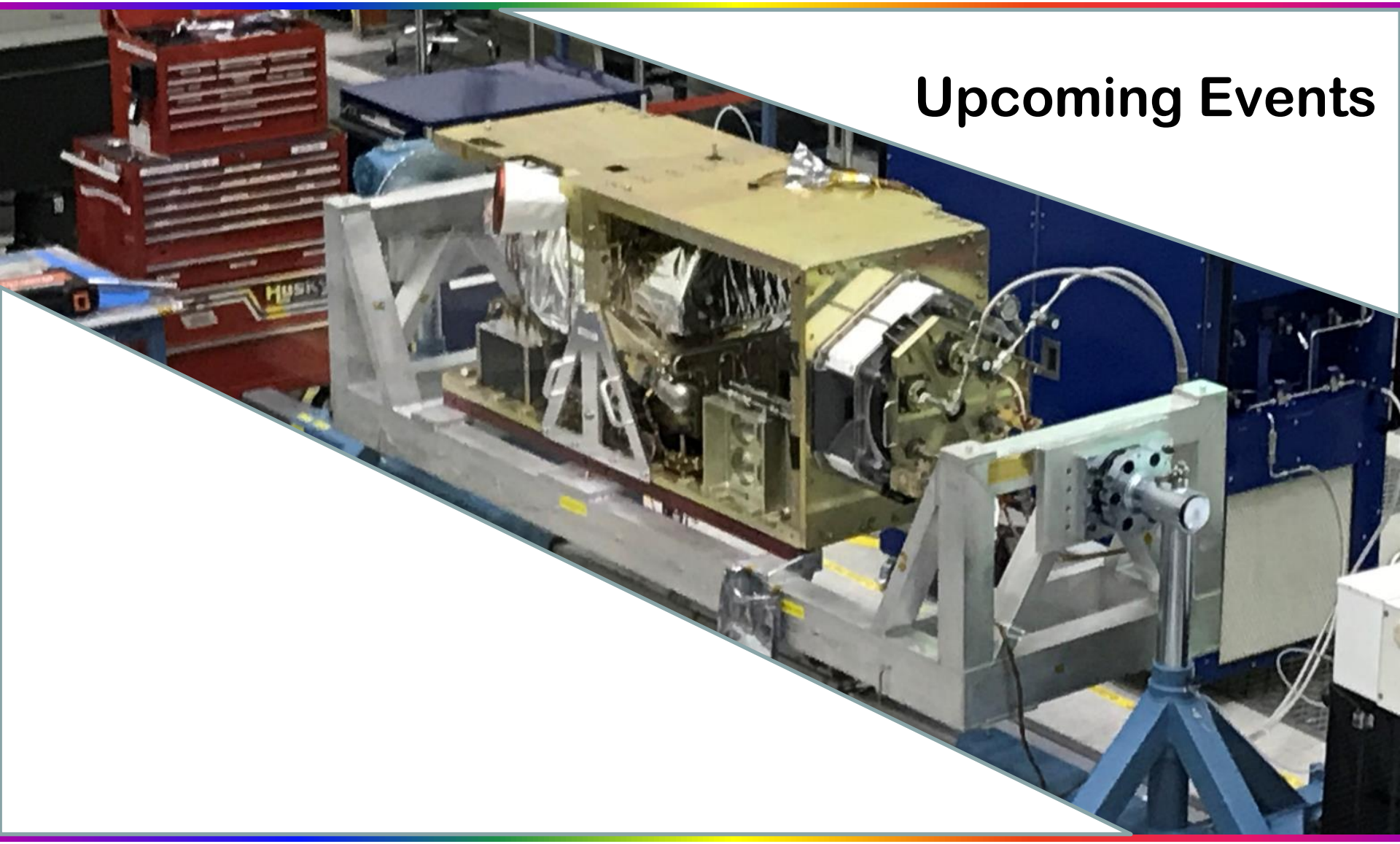
Science Team Meeting Website: https://sites.google.com/view/oco2stm1017

Draft Agenda Day 2

Wednesday, March 21th, Ramo Auditorium, Caltech

Science Plenary	Ian Baker	9:00 AM	9:30 AM	0:30
flux group - breakout round up and go forward plan	David Baker	9:30 AM	10:15 AM	0:45
discussion	ALL	10:15 AM	10:30 AM	0:15
coffee		10:30 AM	11:00 AM	0:30
SIF presentation/ discussion	SIF Team	11:00 AM	12:00 PM	1:00
UQ and ties to flux work	Jon Hobbs	12:00 PM	12:30 PM	0:30
lunch		12:30 PM	1:30 PM	1:00
cloud/ aerosol analysis	Aronne Merrelli	1:30 PM	1:50 PM	0:20
Speed talks part 2	the team	1:50 PM	2:20 PM	0:30
discussion	the team	2:20 PM	3:10 PM	0:15
coffee		3:10 PM	3:40 PM	0:30
OCO-3 sims and development status	Annmarie & team	3:40 PM	4:00 PM	0:20
ISS instruments (ECOSTRESS, GEDI)	TBD TBD	4:00 PM	4:20 PM	0:20
International measurements	Dave Crisp	4:20 PM	4:40 PM	0:20
final science presentations(???)	team	4:40 PM	5:10 PM	0:30
go forward plan	Gunson/ Eldering	5:10 PM	5:30 PM	0:20
meeting close	Gunson/ Eldering	5:30 PM	5:30 PM	

Science Team Meeting Website: https://sites.google.com/view/oco2stm1017



Upcoming Events

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Planned Date	Activity Description
19-21 Mar	OCO-2 Science Team meeting in Pasadena, CA
Mar/Apr	Annual Inclination Adjust Maneuver (IAM) campaign
8 –13 Apr	European Geosciences Union (EGU) Meeting, Vienna
2 – 4 May	CEOS AC-VC Annual Meeting, College Park, MD
8 –10 May	IWGGMS (International Workshop on Greenhouse Gas Measurements from Space) in Toronto, Canada
20-24 May	Japan Geosciences Union (JpGU) Meeting in Chiba, Japan
22-24 May	46th Global Monitoring Annual Conference (GMAC), Boulder
3 – 8 Jun	AOGS (Asia Oceania Geosciences Society) in Honolulu, HI
11–15 Jun	2018 NDACC-IRWG & TCCON Annual Meeting, Mexico City
26 Jun – 2 Jul	2018 Railroad Valley Campaign, Railroad Valley, NV, USA
14 – 22 Jul	42nd COSPAR Scientific Assembly, Pasadena, CA, USA